CLAIMS

We Claim:

1. A lithography system comprising:

an illumination source;

an optical system;

a stage suitable for supporting a wafer or a reticle;

a frame that supports the stage;

a stage utility transfer means for transferring utilities between the stage and the frame, the stage utility transfer means being located within or on a surface of the stage; and

a frame utility transfer means for transferring utilities between the stage and the frame, the frame utility transfer means being located within or on a surface of the frame, whereby the stage and the frame can remain physically separated from each other while utilities are transferred between the stage and the frame.

2. A lithography system as recited in claim 1 wherein the stage and the frame transfer means transfer electrical power, electrical signals, optical signals, heat, gas, solids, and/or fluids between the stage and the frame.

3. A lithography system as recited in claim 2 wherein the stage further comprises:

at least one processing means for processing electrical signals received from the frame utility transfer means.

4. A lithography system as recited in claim 2 wherein the stage further comprises:

at least one buffering means for storing utilities within the stage.

5. An object manufactured with the lithography system of claim 1.

6. A wafer on which an image has been formed by the lithography system of claim 1.

7. A method for making an object using a lithography process, wherein the lithography process utilizes a lithography system as recited in claim 1.

8. A method for patterning a wafer using a lithography process, wherein the lithography process utilizes a lithography system as recited in claim 1.

9. A lithography system comprising:

a transformer that includes an inductive core, a primary inductive coil, and a secondary inductive coil, wherein the inductive core has a first and a second end and wherein the primary inductive coil is wrapped around the first end of the inductive core;

a stage suitable for supporting a wafer or a reticle wherein the stage houses the secondary inductive coil; and

a frame that supports the stage and the inductive core such that the second end of the inductive core extends into the secondary inductive coil, wherein each side surface of the inductive core maintains a minimum distance of separation from an inner surface of the secondary inductive coil, whereby an electrical current within the primary coil creates an electromagnetic field that causes electrical current to flow within the secondary inductive coil.

10. A lithography system as recited in claim 9 wherein each surface of the stage maintains a minimum distance of separation from a respective surface of the frame.

11. A lithography system as recited in claim 9 wherein the stage moves relative to the frame along a scanning axis and wherein a longitudinal axis of the second end of the inductive core is parallel with the scanning axis.

12. A lithography system as recited in claim 9 wherein the stage houses multiple secondary inductive coils, the second end of the inductive core extending through each of the multiple secondary inductive coils.

13. A lithography system as recited in claim 9 further comprising:

a stage radio frequency transmitter, receiver, or transceiver positioned within the stage; and

a frame radio frequency transmitter, receiver, or transceiver positioned on the frame, wherein the stage and frame radio frequency transmitters, receivers, or transceivers transfer electrical signals therebetween.

14. A lithography system as recited in claim 9 further comprising:

a stage optical signal transmitter, receiver, or transceiver positioned within the stage; and

a frame optical signal transmitter, receiver, or transceiver positioned on the frame, wherein the stage and frame optical signal transmitters, receivers, or transceivers transfer optical signals therebetween.

15. A lithography system as recited in claim 14 wherein the stage moves relative to the frame along a scanning axis and wherein the optical signals transmitted between the stage and frame optical signal transmitters, receivers, or transceivers travel along an axis that is substantially parallel with the scanning axis.

16. A lithography system as recited in claim 9 further comprising:

at least one stage heat transfer surface on a surface of the stage; and

at least one frame heat transfer surface on the frame, wherein the stage and the frame heat transfer surfaces are separate but adjacent to each other such that heat from the stage heat transfer surface can be transferred to the frame heat transfer surface.

17. A lithography system as recited in claim 16 further comprising:

a heat sink that is positioned within the stage and connected to the stage heat transfer surface.

18. A lithography system as recited in claim 17 wherein the heat sink contains heat storage material suitable for collecting and storing heat generated by the stage as latent heat as the heat generated by the stage causes the heat storage material to undergo a phase change

19. A lithography system as recited in claim 9 wherein a top surface of the stage is adjacent to a bottom surface of the frame, the top surface of the stage having a passageway opening and the bottom surface of the frame having a cavity wherein the

cavity is positioned above the passageway opening, whereby gas and fluids can be transferred between the passageway opening and the cavity.

20. A lithography system as recited in claim 19 wherein the stage further comprises a stage reservoir capable of releasing gas through the passageway opening and wherein the frame includes a vacuum pump and a vacuum passageway, the vacuum passageway having an opening within the cavity, whereby the vacuum pump can collect the gas released from the stage reservoir into the vacuum passageway.

21. A lithography system as recited in claim 19 wherein the stage further comprises:

heat storage material selected to collect and store heat generated by the stage as latent heat as the heat generated by the stage causes the heat storage material to undergo a phase change.

22. A lithography system as recited in claim 21 whereby the heat storage material maintains a relatively constant temperature while collecting and storing heat from the stage.

23. A lithography system as recited in claim 21 wherein the heat storage material is paraffin wax.

24. A lithography system as recited in claim 21 wherein the heat storage material is in the form of granules that are each encapsulated within a respective support structure.

25. A lithography system as recited in claim 24 further comprising a deposition mechanism configured to transfer the heat storage material into the stage such that gravity causes the heat storage material to move from the deposition mechanism into the stage.

26. A lithography system as recited in claim 25 wherein the stage has an opening for receiving the heat storage material from the deposition mechanism.

27. A lithography system as recited in claim 25 wherein the stage has a bottom opening for releasing the heat storage material from the stage.

28. A lithography system as recited in claim 9 wherein a top surface of the stage is adjacent to a bottom surface of the frame, the top surface of the stage having a recessed well and the bottom surface of the frame having a cavity wherein the cavity is positioned above the well, whereby gas and fluids can be transferred between the well and the cavity.

29. A lithography system as recited in claim 28 wherein the stage further comprises a stage reservoir capable of releasing gas into the well and wherein the frame includes a vacuum pump and a vacuum passageway, the vacuum passageway having an opening within the cavity, whereby the vacuum pump can collect the gas released from the stage reservoir into the vacuum passageway.

30. A lithography system as recited in claim 29 wherein the stage reservoir is further capable of releasing a fluid into the well, the stage further comprising:

a heating element configured to heat the well such that liquid released into the cavity can be evaporated.

31. A lithography system as recited in claim 28 the stage further comprises:

a cooling element configured to cool a surface of the recessed cavity so that moisture can condense on the surface of the well.

32. A lithography system as recited in claim 9 where in the stage further comprises:

a rechargeable battery, a capacitor, and/or an ultra-capacitor for storing electrical power drawn from the secondary inductive coil.

33. A lithography system as recited in claim 9 where in the stage further comprises:

at least one memory device, amplifier, driver, actuator, and/or sensor.

34. A method for transferring utilities between a stage and a base of a lithography system comprising:

connecting a supply channel between the frame and the stage;

transferring utilities between the stage and the frame through the connected supply channel; and

disconnecting the supply channel from the stage.

35. A method as recited in claim 34 further comprising:

stabilizing the stage from a scanning motion to a stationary position before connecting the supply channel; and

causing the stage to resume a scanning motion after disconnecting the supply channel.

36. A method as recited in claim 34 wherein the connecting operation includes connecting electrically conductive cables to the stage and the transferring operation includes transferring electrical power and/or electrical signals through the cables.

37. A method as recited in claim 34 wherein the connecting operation includes extending electrically conductive electrodes from the frame such that they make contact with electrical contacts on the stage.

38. A method as recited in claim 34 wherein the connecting operation includes moving a surface of the stage closer to a surface of the frame such that the supply channel is brought into contact with the frame.

39. A method as recited in claim 34 wherein the connecting operation includes connecting hoses to the stage and the transferring operation includes transferring gases and/or fluids through the hoses.

40. A method as recited in claim 39 wherein the gases and/or fluids contain heat storage material suitable for collecting and storing heat generated by the stage as latent heat as the heat generated by the stage causes the heat storage material to undergo a phase change

41. A method as recited in claim 39 further comprising:

evacuating an area surrounding the hoses between the stage and the frame, whereby any gases and/or fluids that leak out of the hoses can be collected.

42. A method as recited in claim 34 further comprising:

connecting a stage heat transfer surface that is located on the stage to a frame heat transfer surface that is located on the frame, whereby heat can be transferred from the stage to the frame; and

disconnecting the stage heat transfer surface from the frame heat transfer surface.

43. A method as recited in claim 34 further comprising:

receiving utilities within the stage from the frame through the connected supply channel; and

storing the received utilities within the stage.

44. A lithography system comprising:

a transformer that includes at least a primary inductive coil and a secondary inductive coil, wherein the secondary inductive coil has a first end and a second end, the first and second ends being at opposite ends of a lengthwise axis of the secondary inductive coil;

a stage suitable for supporting a wafer or a reticle wherein the stage is attached to at least the first end of the secondary coil and thereby supports the secondary inductive coil; and

a frame that supports the primary coil such that the primary coil is proximate to the secondary coil wherein the primary coil and the secondary coil maintain a separation distance from each other when the stage moves relative to the frame along the lengthwise axis of the secondary coil, whereby an electrical current within the primary coil creates an electromagnetic field that causes electrical current to flow within the secondary inductive coil.

45. A lithography system as recited in claim 44 wherein the stage is supported over the frame such that the stage and frame remain physically separated from each other.

46. A lithography system as recited in claim 44 wherein the secondary coil is wound such that it has the shape of an elongated loop.

47. A lithography system as recited in claim 46 wherein the frame contains two passageways and respective sections of the secondary coil passes through each passageway.

48. A lithography system as recited in claim 47 wherein the frame includes an inductive core that separates each of the two passageways and wherein the primary inductive coil is wrapped around the inductive core.

49. A lithography system as recited in claim 44 wherein the frame has at least one passageway, and wherein the secondary inductive coil extends through the passageway.

50. A lithography system as recited in claim 49 wherein the secondary inductive coil is a solenoid.

51. A lithography system as recited in claim 50 wherein the primary inductive coil is wrapped around an inner surface of the passageway such that the primary inductive coil surrounds at least a portion of the solenoid.

52. A lithography system as recited in claim 44 wherein the stage further comprises electrical components that draw electrical current from the current created within the secondary inductive coil.

53. A lithography system comprising:

an illumination source;

an optical system;

a stage suitable for supporting a reticle or wafer;

a stage port located on a surface of the stage;

a frame for supporting the stage;

a frame port located on a surface of the frame wherein the stage port and the frame port are suitable for making a connection with each other so that gas and/or fluids can be transferred between the stage and the frame; and

a frame vacuum pump within the frame, the frame vacuum pump having vacuum passageways that extend to the surface of the frame at positions around a perimeter of the frame port, whereby the frame vacuum pump can evacuate any gas and/or fluids that leak from the connection between the stage port and the frame port.

54. A lithography system as recited in claim 53 further comprising:

a stage vacuum pump within the stage, the stage vacuum pump having vacuum passageways that extend to the surface of the stage at positions around a perimeter of the stage port, whereby the stage vacuum pump can evacuate any gas and/or fluids that leak from the connection between the stage port and the frame port.

55. A lithography system as recited in claim 53 further comprising:

a stage reservoir positioned within the stage and connected to the stage port, the stage reservoir suitable for storing gases and/or fluids; and

a frame reservoir positioned within the frame and connected to the frame port, the frame reservoir suitable for storing gases and/or fluids.

56. An object manufactured with the lithography system of claim 53.

57. A wafer on which an image has been formed by the lithography system of claim 53.

58. A method for making an object using a lithography process, wherein the lithography process utilizes a lithography system as recited in claim 53.

59. A method for patterning a wafer using a lithography process, wherein the lithography process utilizes a lithography system as recited in claim 53.